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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/046,632
Filing Date: January 14, 2002
Appellant(s): DEN BRINKER, ALBERTUS CORNELIS

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EXAMINER'S ANSWER

This is in response to the appeal brief filed 10/23/2006 appealing from the Office action mailed 03/01/2006.

(1) Real Party of Interest

A statement identifying the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

Edler et al. "Audio Coding Using a Psychoacoustic Pre-and Post- Filter" Proceedings of ICASSP 2000, pp. 881-884.

Kleijn et al. "Speech Coding and Synthesis" Elsevier Science, 1995, pp. 36-39.

Harma et al. "Frequency-Warped Signal Processing for Audio Applications" J. Audio Eng. Soc. Vol. 48, No. 11, Nov 2000, pp. 1011-1031.

Oppenheim et al. "Computation of Spectra with Unequal Resolution Using the Fast Fourier Transform" Proc. IEEE, vol. 59, pp. 299-301, Feb. 1971.

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. Claims 1, 2, 3, 9, 10, 11, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Edler et al. ("Audio Coding Using a Psychoacoustic Pre- and Post-filter", Proc. ICASSP 2000), hereinafter referred to as Edler, in view of Kleijn et al. ("Speech Coding and Synthesis", Elsevier Science, 1995), hereinafter referred to as Kleijn.

Regarding **claim 1**, Edler teaches audio coding using a psychoacoustic pre- and post-filter. Edler's teachings include the following:

- a segmentation unit (120) for segmenting said signal s into at least one single scale segment x.sub.m(n) with m=1 . . . M and for outputting the samples x.sub.m(0), . . . , x.sub.m(L-1) of said segment x.sub.m(n) (§'s 2 and 3, audio in where Figs. 3 and 4 show sampling); and
- the segmentation unit (120) is further embodied for carrying out a frequency-warping operation in order to transform the output samples x.sub.m(0), ..., x.sub.m(L-1)) onto a frequency-warped domain (§3, ¶2, frequency-warping technique); and
- a post-processing filter (160) is provided for re-mapping [*said sinusoidal data output from the sinusoidal estimation unit (140) (see below)*] to the original frequency domain of the signal s (§'s 2 and 3, post filter; Fig. 2, operations of decoding and post filtering restore the signal to the original frequency domain) . Edler teaches perceptual

audio coding (abstract), but Edler does not specifically teach "a sinusoidal estimation unit (140) for estimating the sinusoidal code data representing said segment x.sub.m(n) from the received samples x.sub.m(0), . . . , x.sub.m(L-1))." However, the examiner contends that this concept was well known in the art, as taught by Kleijn.

In the same field of endeavor, Kleijn teaches sinusoidal coders including the sinusoidal encoding operation (p. 37, §8.2, ¶3, Fig. 11).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Edler by specifically using the technique, as taught by Edler, because it is well known in the art at the time of invention as a natural (and standard) way of encoding speech (Kleijn, §8.2, ¶1).

Regarding **claim 2**, Edler in view of Kleijn teaches everything claimed, as applied above (see claim 1). In addition, Edler teaches:

- a plurality of L-1 filters (122_1, ... 122_L-1) being connected in series for receiving the signal s(n) at the input of the first of said filters (122_1) (Figs 3 and 5); and
- a sampling unit (124) for receiving and sampling said signal s(n)=yo(n) as well as the output signals yt(n)•••yL-t(n) of said L-1 filters (122_1, ... 122_L-1) in order to generate L samples xm(0), ..., xm(L-1) or x„°, (0), ..., x„° (L-1) of the segment x_m (Figs. 3 and 5).

Regarding **claim 3**, Edler in view of Kleijn teaches everything claimed, as applied above (see claim 2). In addition, Edler teaches "at least some of the filters (122_1, ... 122_L-1) are embodied as all-pass filters" (§3, can be implemented by an allpass).

Regarding **claim 9**, this claim has limitations similar to claim 1 and is rejected for the same reasons.

Regarding **claim 10**, this claim has limitations similar to claim 1 and is rejected for the same reasons.

Regarding **claim 11**, this claim has limitations similar to claim 2 and is rejected for the same reasons.

Regarding **claim 12**, this claim has limitations similar to claim 3 and is rejected for the same reasons.

2. Claims 4, 5, 7, 8, 13, 14, 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Edler in view of Kleijn and further in view of Harma et al. ("Frequency-Warped Signal Processing for Audio Applications," J. Audio Eng. Soc. Vol. 48, No. 11, Nov 2000), hereinafter referred to as Harma.

Regarding **claims 4 and 5**, Edler in view of Kleijn teaches everything claimed, as applied above (see claim 3). But Edler does not specifically teach "characterized in that the some (or all [for claim 5]) filters (122_1, ...122_L-l) are embodied as first-order all-pass filter each having a transfer function A(z) according to: [equation given in the claim]." However, the examiner contends that this concept was well known in the art, as taught by Harma.

In the same field of endeavor, Harma teaches frequency-warped signal processing for audio applications including the use of an all-pass filter chain given by the equation as stated in the claim (§2.1).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Edler in view of Kleijn by specifically providing the us of the particular transfer function, as taught by Harma, because it is well known in the art at the time of invention for the purpose of implementing a warping filter (Harma, §2).

Regarding **claim 7**, Edler in view of Kleijn teaches everything claimed, as applied above (see claim 2). But Edler does not specifically teach the following: "in the segmentation unit (120) the plurality of L-1 filters (122_1, . . . 122_L-1) being connected in series is embodied as tapped delay-line with each of the filters having a transfer function of A(z)=z. $^{-1}$; and there is additionally provided a bi-lateral warping unit (126) for transforming the samples on the original frequency-domain of the signal s $x^o_m(-N_1)$, . . . , $x^o_m(N_2)$ output by the sampling unit (124) into transformed samples x_m $(-M_1)$, . . . ,

$x^o_m(M_2)$ on a frequency-warped domain by applying a bi-lateral frequency warping operation to the samples $x^o_m(-N_1)$, . . . , x^o_m (N_2) and for outputting the transformed samples $x_m(-M_1)$, . . . x_m (M_2) to said sinusoidal estimation unit (140)." However, the examiner contends that this concept was well known in the art, as taught by Harma.

In the same field of endeavor, Harma teaches frequency-warped signal processing for audio applications including warping as a conformal bilinear mapping (the use of an all-pass filter chain given by the equation as stated in the claim (§2.1-2.4, see equations 14-19).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Edler in view of Kleijn by specifically providing the us of the particular transfer function, as taught by Harma, because it is well known in the art at the time of invention for the purpose of implementing a warping filter (Harma, §2).

Regarding **claim 8**, Edler in view of Kleijn and Harma teaches everything claimed, as applied above (see claim 7). In addition, Harma teaches the use of transforms that implement the equation given in claim 8 (§2.1-2.4).

Regarding **claim 13**, this claim has limitations similar to claim 4 and is rejected for the same reasons.

Regarding **claim 14**, this claim has limitations similar to claim 5 and is rejected for the same reasons.

Regarding **claim 16**, this claim has limitations similar to claim 7 and is rejected for the same reasons.

Regarding **claim 17**, this claim has limitations similar to claim 8 and is rejected for the same reasons.

3. Claims 6 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Edler in view of Kleijn and Harma and further in view of Oppenheim et al. ("Computation of Spectra with Unequal Resolution Using the Fast Fourier Transform," Proc. IEEE, vol. 59, pp. 299-301, Feb. 1971), hereinafter referred to as Oppenheim.

Regarding **claim 6**, Edler in view of Kleijn and Harma teaches everything claimed, as applied above (see claim 4). But Elder in view of Kleijn and Harma does not specifically teach "the first filter (122_1) in said series connection receiving the signal s(n) has a transfer function A0(z) [1st equation given in claim]; and the second filter (122_2) in said series connection following said first filter (122_1) has a transfer function A 1(z) according to: [2nd equation given in claim] the remaining filters (122_3...122_L-1) each are first order all-pass filters having a transfer function A(z)

according to claim 4." However, the examiner contends that this concept was well known in the art, as taught by Oppenheim.

In the same field of endeavor, Oppenheim teaches a technique for the computation of spectra with unequal resolution using fast Fourier transform. Oppenheim further teaches the use of filters as stated in claim 6 (Fig. 2).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Edler in view of Kleijn and Harma by specifically providing particular network, as taught by Oppenheim, because it is well known in the art at the time of invention for the purpose of implementing a warping filter (Oppenheim, abstract, ¶1).

Regarding **claim 15**, this claim has limitations similar to claim 7 and is rejected for the same reasons.

(10) Response to Argument

I. Rejection of Claims 1, 2, 3, 9, 10, 11 and 12

a. The applied art fails to disclose at least a sinusoidal estimation unit adapted to estimate the sinusoidal code data.

1. Appellants assert on page 9:

> Thus, a **coding sequence** is described in the portion of the reference to Kleijn, et al. relied upon in the Office Action. The reference does not teach

> or suggest the claimed **estimating the sinusoidal code data**, but rather the generation of sinusoidal code from a signal.

The examiner maintains that the claimed subject matter corresponds to the teachings of Edler et al. in view of Kleijn et al. as indicated in the rejections of claims 1, 9 and 10. Kleijn et al. teach in Figure 11 (p. 38), the performance of an FFT on a windowed segment [segment $x_m(n)$] with further processing performed to quantize the spectrum. Kleijn et al. state (in the last paragraph on page 37):

> The complex spectrum of each of these windowed signals is obtained by means of a fast Fourier transform (FFT). The spectrum is separated into magnitude and phase spectra. The peaks in the magnitude spectrum are determined, and the rest of the spectrum is effectively set to zero. The magnitudes, the phases and the frequencies of this sparse spectrum are quantized, and their quantization indices are transmitted to the decoder.

The Appellants' specification states: "The estimation may be done by carrying out a Fourier transformation on said frequency-warped samples and subsequent, for instance, peak picking." (Specification, p. 4, starting at the last sentence). In the rejection of claim 1, Edler et al. teach the frequency warping (§3, ¶2, frequency-warping technique), and Kleijn et al. teach the use of the Fourier transform with subsequent peak-picking (an estimation technique). The examiner also notes that any application of the fast Fourier Transform necessarily produces an <u>estimation</u> (i.e., an approximate result—this fact is very well-known to any practitioner of the art). Thus, it could be argued that Edler et al. satisfy the estimation requirement in two ways (by taking an FFT and peak determination).

2. Appellants assert on page 10:

> Moreover, the taking of a fast Fourier Transform (FET) as disclosed in Kleijn, et al. relates to sinusoidal coding, and not to estimating sinusoidal code data as specifically claimed. There is no teaching of the claimed estimating or of the claimed sinusoidal estimation unit. Respectfully, given the lack of disclosure in the applied art, and the unsubstantiated assertions of the Examiner, Applicants submit that the Examiner is applying hindsight knowledge of Applicants' invention and attempting to garner features from the applied art, which are hot found therein. As set forth in Sensonics Inc. v Aerosonics Corp.: Relying upon hindsight knowledge of applicants' disclosure when the prior art does not teach nor suggest such knowledge results in the impermissible use of the invention as a template for its own reconstruction. Thus, the rejection is improper and should be withdrawn.

See arguments above in section 1. It is also noted that Edler et al. teach audio coding with frequency warping (§3, ¶2) and Kleijn et al. sinusoidal estimation (FFT, pick-picking, etc., clearly producing sinusoidal code data) where Kleijn et al. supply support for this combination by indicating that this is a natural and standard way of encoding speech (§8.2, ¶1).

<u>II. Rejection of Claims 4, 5, 7, 8, 13, 14, 16, and 17.</u>

See arguments in sections 1, and 2, above.

<u>III Rejection of Claims 6 and 15.</u>

See arguments in sections 1, and 2, above.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

11/16/06

V. Paul Harper

Patent Examiner

Art Unit 2626

Conferees:

David Hudspeth

Richemond Dorvil